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Indian Standard

SPECIFICATION FOR RUBBER HOSE FOR FUEL DISPENSING

(Third Revision)

UDC 621·643·3 [678·4] : 629·119·5

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 2

June 1989

Indian Standard

SPECIFICATION FOR RUBBER HOSE FOR FUEL DISPENSING

(Third Revision)

0. FOREWORD

0.1 This Indian Standard (Third Revision) was adopted by the Bureau of Indian Standards on 5 December 1988, after the draft finalized by the Rubber Products Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

0.2 This standard was first published in 1963 and subsequently revised in 1968 and 1981.

0.3 In this third revision requirements for elongation at break, and adhesion have been modified and requirement for increases in outer diameter at proof pressure has been included. Further all the other changes necessary to align this standard with others in the series of standards on hoses have also been introduced.

0.4 This standard contains clause **3.2.3**, which calls for an agreement between the purchaser and the supplier.

0.5 In the preparation of this standard, considerable assistance has been derived from ISO 5772/1-1986 'Rubber hoses — Measured fuel dispensing — Part 1 Conventional petroleum based fuels — Specification', issued by the International Organization for Standardization.

0.6 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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*Rules for rounding off numerical values (*revised*)

1. SCOPE

1.1 This standard prescribes the requirements and methods of sampling and test for rubber hose with braided textile reinforcement, manufactured either by mandrel or long length moulded process for use in dispensing pumps for petrol and diesel fuels for a working pressure of 0·4 MPa.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given in various parts of IS : 7503* shall apply.

3. REQUIREMENTS

3.1 Construction

3.1.1 *Lining* — The rubber inner lining shall be smooth in bore and resistant to petrol and diesel fuels.

3.1.2 *Reinforcement* — The reinforcement shall be of one or more layers of natural or synthetic textile or combination thereof, and shall be applied by a suitable technique.

3.1.3 *Cover* — The rubber cover shall be resistant to weather, abrasion, petrol and diesel fuels. The cover shall be smooth or fluted or may have a cloth marked finish.

3.1.4 The lining and cover of the hose shall be uniform in thickness reasonably concentric and free from air blisters, porosity and splits.

3.1.5 Not less than two low resistant electrical bonding wires shall be provided between or incorporated in the reinforcement plies and arranged in such a manner that reliable electrical continuity is maintained along the length of the hose in service and possibility of fracture of the strand is minimized. Each bonding wire shall have not less than nine strands, and the metal used shall have high resistance to fatigue. If the hose is supplied without end connections, the bonding wires shall protrude approximately 100 mm at each end of the hose.

3.2 Dimensions and Tolerances

3.2.1 *Bore Size, Outside Diameter and Tolerance* — The outside diameter and bore size when measured according to methods prescribed in **4.2.1.1** and **4.2.1.2** of IS : 443-1975* shall be as given in Table 1.

3.2.2 *Lining and Cover Thickness* — The thickness of lining and cover of the hose when determined according to **4.2.2** of IS : 443-1975* shall be as given in Table 1.

3.2.3 *Length* — The length of the hose shall be as agreed to between the purchaser and the supplier.

3.2.3.1 Tolerance on any specified hose length shall be ±1 percent.

3.4 Requirements of Physical Tests of Finished Hose

3.4.1 The requirements of physical tests on finished hose shall be as given in Table 2.

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*Glossary of terms used in rubber industry.

*Methods of sampling and test for rubber hoses (*second revision*).

3.5 Performance Requirements

3.5.1 The performance requirements for finished hose shall be as given in Table 3.

4. MARKING

4.1 Each length of the hose shall be indelibly marked at intervals of approximately 3 m:

a) Manufacturer's name or trade-mark, hose denomination; and

b) Month and year of manufacture, if required by the purchaser.

TABLE 1 NOMINAL BORE SIZE AND TOLERANCE ON NOMINAL BORE SIZE AND MINIMUM THICKNESS OF LINING AND COVER

(*Clauses* 3.2.1 *and* 3.2.2)

Sl No.	Nominal Bore Size	Tolerance on Nominal Bore Size	Outside Diameter	Tolerance on Outside Diameter	Minimum Thickness of	
					Lining	Cover
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	mm	mm	mm	mm	mm	mm
i)	19·0	± 0·75	32·0	+ 1·0 − 1·5	3·0	1·5
ii)	25·0	± 1·25	38·0	± 1·5	3·0	1·5
iii)	31·5	± 1·25	45·0	± 1·5	3·0	1·5

TABLE 2 PHYSICAL REQUIREMENTS OF FINISHED HOSE

(*Clause* 3.4.1)

Sl No.	Characteristic	Requirement	Test Specimen	Method of Test
(1)	(2)	(3)	(4)	(5)
i)	Tensile strength, MPa, *Min*			
	a) Lining	7·0	Test piece cut from hose	5 of IS : 443-1975*
	b) Cover	7·0		
ii)	Elongation at break, percent, *Min*		Test piece cut from hose	5 of IS : 443-1975*
	a) Lining	200		
	b) Cover	250		
iii)	Accelerated ageing			
	a) Change in tensile strength, percent by the original value, *Max*	± 25	Test piece cut from hose	6 of IS : 443-1975* for 72 h at 100 ± 1°C
	b) Change in elongation at break, percent of the original value	+10, −45	Test piece cut from hose	6 of IS : 443-1975* for 72 h at 100 ± 1°C
iv)	Volume change, percent, *Max*		Test piece cut from hose	9 of IS : 443-1975*
	a) Lining	+ 30, −5		70^{+2}_{-0} h at standard laboratory temperature in liquid B [*See* IS : 3400 (Part 6)-1983†]
	b) Cover	+ 75		
v)	Fuel soluble matter of lining, percent, *Max*	6	Test piece cut from hose	Appendix A

*Methods of sampling and test for rubber hoses (*second revision*).

†Methods of test for vulcanized rubbers: Part 6 Resistance to liquids (*first revision*).

TABLE 3 PERFORMANCE REQUIREMENTS

(*Clause* 3.5.1)

Sl No.	Characteristic	Requirement	Test Specimen	Method of Test
(1)	(2)	(3)	(4)	(5)
i)	Hydrostatic proof pressure 1·5 MPa for 1 minute	No leakage or other signs of weakness	Full length of hose or hose assembly	8.3 of IS : 443-1975* (*see* Note 1)
ii)	Increase in outer diameter at proof pressure, percent, *Max*	7	Full length of hose or hose assembly	8.5 of IS : 443-1975*
iii)	Twist at proof pressure, degree angle per metre, *Max*	20	2 metre long hose sample	Appendix B
iv)	Burst pressure, MPa, *Min*	3·0	Short length cut from hose	8.2 of IS : 443-1975*
v)	Adhesion between components — lining to reinforcement — between reinforcements — reinforement to outer cover, kPa, *Min*	1·5	Test piece cut from the hose	IS : 3400 (Part 5)-1986†
vi)	Electrical continuity	No loss of electrical continuity	Full length of hose or hose assembly	*See* Note 2

Note 1 This test should be carried out at factory. If the hose is offered at places other than the factory, manufacturer's certificate should be accepted.

Note 2 A suitable method of determining electrical continuity is by use of a 4·5 V battery and 3·5 V, 0·3 A test bulb. A dimly lighted bulb is sufficient to indicate satisfactory continuity.

*Method of sampling and test for rubber hoses (*second revision*).

†Methods of test for vulcanized rubbers: Part 5 Adhesion of rubbers to textile fabrics (*second revision*).

4.1.1 Each length of hose may also be marked with the Standard Mark.

NOTE — The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made there-under. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

5. SAMPLING AND CRITERIA FOR CONFORMITY

5.1 For the purpose of ascertaining the conformity of the hose in a consignment to this specification, the scale of sampling and the criteria for conformity shall be as prescribed in 3 of IS : 443 - 1975*.

6. TIME LAPSE BETWEEN RECEIPT OF MATERIAL AND TESTING

6.1 For all the test purposes, the minimum time between vulcanization and testing shall be 16 h.

6.1.1 For product tests, whenever possible, the time between vulcanization and testing should not exceed 4 months. In other cases, tests shall be made within 2 months from the date of receipt of the product by the customer.

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*Methods of sampling and test for rubber hoses (*second revision*).

APPENDIX A

(*Clause* 3.4.1 and *Table* 2)

DETERMINATION OF FUEL SOLUBLE MATTER

A-1. REAGENTS

A-1.1 Toluene — Reagent grade (*see* IS : 1839 - 1961*).

A-1.2 ***Iso*-octane**

A-1.3 Solvent Mixture — A mixture of 30 volumes of toluene and 70 volumes of iso-octane.

A-2. PROCEDURE

A-2.1 Cut the sample into pieces approximately 3 mm square and extract 5 g of the comminuted sample with 100 ml of solvent mixture in a glass flask for 96 h at 27 ± 2°C, suitable precautions being taken to prevent loss by evaporation.

A-2.2 Filter the contents into a hemispherical glass dish of suitable size, washing both the residue in the flask and the filter paper with a further quantity of the solvent mixture. Evaporate the contents of the dish on a boiling water bath and heat the residue in a ventilated air-oven for 2 h at 150 ± 3°C.

A-2.3 Calculate the mass of residual fuel soluble matter as a percentage of the original mass of the comminuted sample. Carry out a blank determination on the solvent mixture and correct the result as necessary.

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*Specification for toluene, reagent grade.

APPENDIX B

(*Clause* 3.5.1 and *Table* 3)

MEASUREMENT OF TWIST

B-1. PROCEDURE

B-1.1 The twisting test is made on a 2 m overall length from fitting to fitting of the hose. The upper fitting, provided with a supply tubing is attached to a potence so as to hang in a fixed position. The lower fitting is clogged with a stopper provided with an index and a swivel able to hold the hose vertically. The index mounted on a pivot moves on a dial in fixed position graduated in degrees to measure the angle of twisting. The apparatus shall be capable of giving readings with an accuracy of 1 degree.

B-1.2 The hose is subjected to hydraulic pressure of 0·4 MPa. One of the fittings is rotated 90° around the centre line of the hose against the other fitting held steady, first clockwise and then counter-clockwise, with the hose held for a period of 5 minutes in each position.

B-1.3 Subject the hose to hydraulic pressure of 1·5 MPa. Record the angle of twisting under this pressure held for a period of 1 minute. Calculate the angle of twist for 1 m length.

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002
Telephones: 3310131, 3311375

Telegrams: Manaksanstha
(Common to all Offices)

Regional Offices:	Telephone
Central: Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002	3310131, 3311375
*Eastern: 1/14 C.I.T. Scheme VII M, V.I.P. Road, Maniktola, CALCUTTA 700054	362499
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*Sales Office in Calcutta is at 5 Chowringhee Approach, P.O. Princep Street, Calcutta 700072 276800
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[*Page* 2, *Table* 3, *Sl No.* (v), *col* 2] — Substitute 'kN/m width' *for* 'kPa'.

(PCD 13)

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